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161 12 m.; densities increase from Ganjam (420) to E Godavari (714) and then decrease to Guntur (393); beyond the regional limits Nellore, with more Archaean terrain than the central parts of the Circars, and less (and less reliable and well distributed) rain than the Nn, had only 204. On the whole it seems best to treat Ganjam/Vizagapatam and the deltas separately.

(a) *The North*: *Ganjam and Vizagapatam* (*Vizakhapatnam*)

[132] Essentially this is the area with over 40 ins.: the three Sn taluks of
133 Vizagapatam fall a little short of this. The lowland narrows to 12 miles under Mahendragiri, but on either side of this gate are the embayments of the Rushikulya (Ganjam) and the Languliya and Vansadhara (Vizag) valleys. The plains are floored by red lateritic soils near the hills, shading off into black loams and clays; but they are cut up by numerous irregular outliers of the En Hills: thus Vizagapatam itself lies between the 1600-ft Kailana Ridge to the N and the 1100-ft Yaroda to the S; the latter runs out to sea in the bold cliffs (300 ft) of Dolphin's Nose which shelters the port, while in the Nn suburbs of the town are the peculiar Waltair Highlands, *c.* 150 ft high and formed largely by the accumulation, since the Pleistocene, of red loams partly fluviatile and partly perhaps aeolian.[3]

311 Of a TSA of some 4 m. ac., rice accounts for about 1·65 m. ac., ragi
312 390,000, oilseeds (chiefly groundnut) 500,000, the balance being widely
241 distributed amongst millets and pulses mainly. Irrigation is on the whole unimportant, much of it being dependent on temporary mud-and-brush-wood dams across the short rivers.

135 Mineral resources are few—graphite, manganese, kaolin, mica—and hardly developed; a potential resource of some interest in this atomic age, though limited in amount in comparison with other *Indian* occurrences, is the ilmenite and monazite in the dunes and beaches around Vizagapatam.[4]

471 Industrial development—with the important exception of the Vizag shipyards—is again negligible: two or three jute and sugar mills in the Vizagapatam plains. Hydro-electric development in the hills might alter this.

369 Again there is only one real town, 'Vizag' itself (**108,042**), which has
[504] developed considerably since the opening of the railway up the Languliya
316 valley to Raipur and the subsequent dredging of a deep-water harbour in the tidal marshes. The accommodation at quayside is limited, but it is more up-to-date than at most E coast ports. The selection of Vizag as the main shipbuilding centre of *India* is presumably because of its situation as the
[439] nearest *ocean* port to Jamshedpur, but it is still a long way round. Ships up to 8000 tons have been launched. The hinterland extends to Nagpur and the chief trade is in Madhya Pradesh (CP) manganese, and oilseeds and
504 their products. The small ports of Bimlipatam and Gopalpur are quite

[3] See the very original paper by C. Mahadevan and N. Sathapathi, "The Origin of the Waltair Highlands", *IGJ* XXIV (1949), 26–51.

[4] *Ibid.*, *loc. cit.*, 29.

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dead, especially since the cessation of coolie emigration to Burma and Malaya.

(b) *The Deltas*

These, like N Kanara on the W coast, form an 'overlap' region, the breaching of the En Hills by the Godavari and the Kistna leaving the limits in the hinterland indeterminate where the hills virtually disappear for about 100 miles. There is of course a marked break of grade where the rivers cross the line of the hills—the Kistna, as we have seen, is actually superimposed across the Nn end of the Cuddapah Ranges, and here the gradient is 3½ ft or more to the mile, against 7–9 ins. near the sea. Their discharge is of course irregular; it has been estimated that in high flood the Kistna carries enough silt "to cover daily an area of 5 sq mls to a depth of one foot".[1]

[1] *Madras Gaz.* (1908), I. 167.

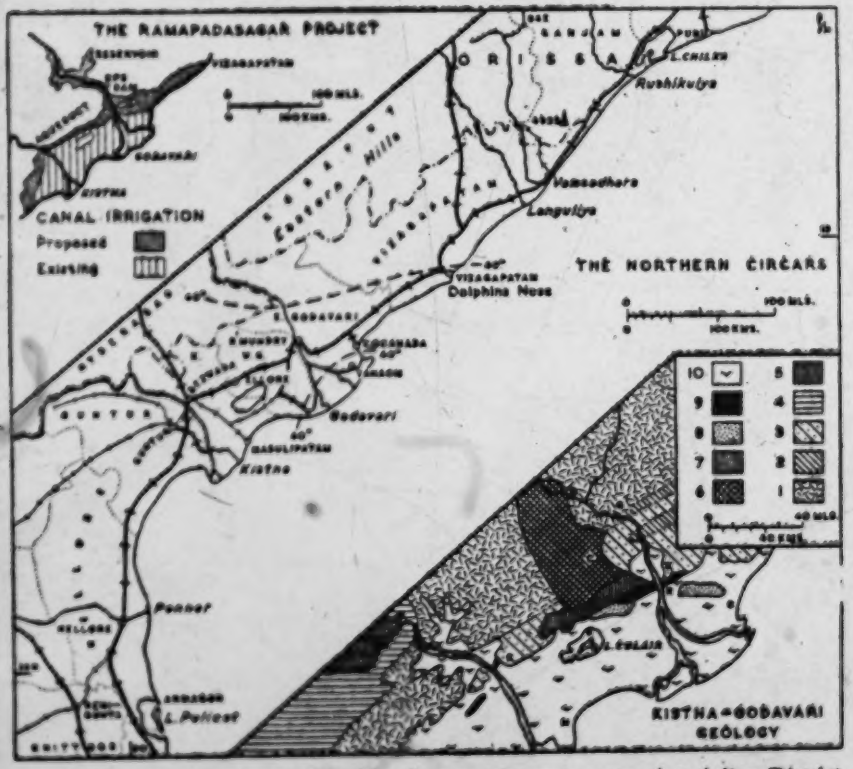

Fig. 140.—ANDHRA DESA: THE NN CIRCARS. On main map, dotted line District boundaries—K, Kistna, WG, W Godavari Dts; all railways ST, BG (thick line) or metre. Geology: 1, Archaean gneisses; 2, Charnockites; 3, Khondalites; 4, Cuddapah; 5, Vindhyan; 6, Lower, 7, Upper, Gondwana; 8, Tertiary; 9, Deccan Lava outlier; 10, alluvium. G, graphite; K, kaolin; C, coal (doubtful value); other initials towns, as on main map.

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For the purely delta taluks, of course, the rice proportion would be higher. Tobacco covers some 200,000 ac. in all, the best being grown on temporary sand-islands in the larger streams. Some sugar is grown, but this tall and long-standing crop must be protected from cyclones by expensive fencing with bamboos.

Again mineral potentialities are slight and development slighter. There are two tiny unworked coalfields, of dubious value, in the Gondwanas along the Godavari; graphite and kaolin are worked in a small way, mainly for Rajahmundry paper mills (which use paddy straw as well as bamboo from the hills) and for the small crucible industry at the same town. Salt evaporation at Cocanada might lead to a chemical industry. Industry itself, though very small-scale, is interesting; as well as the Rajahmundry works just mentioned, and the rice and tobacco trades to be expected, there are cement, silk, fruit canning, and vegetable ghee works. Most of these are congregated along the Kistna below Bezwada and between Rajahmundry and Cocanada. Varied as it is, the total is not impressive: the crucible industry has 150 skilled workers, the paper mill a capacity of 3000 tons p.a.; the 77 rice mills in E Godavari employ only 1800 workers, the three silk factories 122; and the total industrial population of this District is only 7200—0·39% of total population, and at that not much below the figure for Madras State (0·42%). Such as it is, this industrial development has yet led to an ominous, if incipient, competition for land in a few tracts between tobacco and paddy; fortunately the region, except for Guntur, has a sizeable rice surplus (about 400,000 tons less 110,000 tons deficit in Guntur); and counting all foodgrains Guntur also has a surplus.[1]

The industrial, and to some extent the agricultural, future of the region will depend on whether or not the great Ramapadasagar multi-purpose scheme is executed; at present financial difficulties stand in the way. The proposed dam, 428 ft high with foundations 190 ft below the river bed, and 1¼ miles long, would impound 15·6 m. ac.-ft of water, irrigate for paddy some 2·35 m. ac. of un- or under-developed land, improve the supply to 2 m. ac. already irrigated, and develop at least 100,000 kW; it might also, and less beneficially, trap the silt.

There are a fair number of minor towns. The site-significances of Bezwada (161,198) and Rajahmundry (105,276) are plain; Guntur (125,255) and Ellore (64,911) are trading centres with a little industry. The ports of Cocanada (75,140) and Masulipatam (59,146) are of little use. At Masulipatam large ships must lie 5 miles offshore (weather permitting!) and the half-dozen wharves are three miles up a winding creek; yet in early European days it was a place of great importance, famous for carpets and

[1] This discussion is based on (i) Dr. V. L. S. P. Rao's interesting summary of his doctoral dissertation, "Industrial Problems, Development, and Planning [in] . . . the Lower Godavari Region" (*IGJ* XXIII (1948), 1–15); (ii) V. V. Ramanadham and V. L. S. P. Rao, *Economic Atlas of Andhra Desa* (Calcutta, 1949).

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369 chintzes. The opening of the coastal railway completed the ruin of the cyclone of 1864; yet it is still generally known as Bandar ('the port'). 504 Cocanada is rather better, with many more wharves and jetties; but again the anchorage is 5–6 miles offshore. The ports might—at large expense—be developed as outlets for En Hyderabad, should that backward area itself be developed; but obviously the actively prograding deltas impose severe difficulties on any reconstruction; at Cocanada constant dredging is necessary to keep a depth of 4–6 ft (LWOST) on the bar. In the great days of the coolie traffic, before the depression and the Indo-Burmese race-riots 167 of the 1930s, Cocanada had an enormous migrant turnover.

(c) *Nellore*

133 The traditional Sn boundary of the Telugu country lies along the Tiru-312 patti escarpment, overlooking the Renigunta basin; beyond is Tamilnad, a country, almost a nation, on its own. The transition is reflected in the increasing importance of tank-irrigation, though this will be changed if the Penner is ever fully utilised. Physically also the transition is marked by patches of marine Jurassics and the coastal belt of sub-recent Cuddalore sandstones; both become more important in the Madras coastal plain (Fig. 141).

133 Most of Nellore is poor country: low peneplains of Archaean gneisses 311 and schists, stony or lateritic and largely covered with scrub. Even allowing for the large part of the District in the Velikondas, agriculture is severely limited. The coast is fringed by a belt of alluvium 2–14 miles wide, between [339] low-level laterites and the blown sand of the shore. The most interesting coastal feature is the great salt-water lagoon of Pulicat; the islands of the lagoon are used for burning lime from the great shell-banks (this is a main source of *chunam* plaster for Madras building) and salt smuggling is or was important.

312 The Penner and its associated tanks (Fig. 138) are already important for irrigation, and will be more so when the old scheme for an anicut at the Someswaram watergap through the Velikondas is carried out.

135 Away from the Cuddapah Ranges (above, pp. 678–82), the only mineral 471 wealth consists of laterite, building-stones, the coastal salt and shell-lime, and mica from the Archaean schists: output of mica is about 11,000 tons p.a., rather under 10% of *Indian* production. Nellore (56,315) is almost entirely administrative and commercial; it has a little pottery, but other industrial development is practically absent.

631 The Circars form the nucleus of the new Andhra State which neverthe-197 less is to be administered from distant Kurnool. This is the first experiment in "linguistic states", and it can hardly be said that its geographical foundations are very sound or imposing (cf. 126, 675, 682).